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Claims 07 JUL 2006

1. A projection display device comprising:
  - means of generating (2, 4) an image;
  - 5 - means (6) of projecting the image onto a screen (10; 12);
  - the screen comprising a Fresnel lens (16), said Fresnel lens including at least one first area (Z1, Z3) comprising first prisms (28, 40; 41), each
  - 10 first prism having a first side (30, 42) and a second side (32, 44) which forms with a main axis (AA') an angle greater than that formed by the first side and the main axis (AA'),
  - the second side (32, 44) of the first prism being
  - 15 designed to collimate, in line with the main axis (AA'), an incident ray (R1, R3) from said projection means,
  - said Fresnel lens having symmetry of revolution about said main axis,
  - 20 characterized in that said Fresnel lens includes one second area (Z2, Z4) comprising second prisms (34, 46), each second prism having a first side (34, 48) and a second side (38, 50) which forms with a main axis (AA') an angle greater than that formed by the
  - 25 first side (34, 48) and the main axis (AA'),
  - the second side of the second prism being designed to transmit, in a first direction (R2', R4') different from the main axis (AA'), an incident ray (R2, R4) from said projection means.
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2. The device as claimed in claim 1, characterized in that the first area (Z1, Z3) is adjacent to the second area (Z2).
- 35 3. The device as claimed in either of claims 1 and 2, characterized in that the first direction (R2', R4') is divergent from the main axis (AA').

4. The device as claimed in any one of claims 1 to 3, characterized in that the first direction (R2', R4') and the main axis (AA') form between them an angle greater than 1°.
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5. The device as claimed in claim 4, characterized in that the first direction (R2', R4') and the main axis (AA') form between them an angle greater than 2°.
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6. The device as claimed in one of claims 1 to 5, characterized in that the first direction (R2', R4') and the main axis (AA') form between them an angle less than 10°.
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7. The device as claimed in claim 6, characterized in that the first direction (R2', R4') and the main axis (AA') form between them an angle less than 5°.
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8. The device as claimed in one of claims 1 to 7, characterized in that, in at least one of said first and second areas, the first (28, 40) and second (34) prisms work in a reflective mode, the first side of each of the first and second prisms (30, 36) refracting an incident ray from said projection means to the second side of the corresponding prism which reflects the refracted ray to the output of said Fresnel lens.
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9. The device as claimed in one of claims 1 to 8, characterized in that, in at least one of said first and second areas, the first (41) and second (46) prisms work in a refractive mode, the second side of each of the first and second prisms (44, 50) refracting an incident ray from said projection means, to the output of said Fresnel lens.
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10. The device as claimed in one of claims 1 to 9,  
characterized in that, in at least one of said first  
5 areas, the first prisms work in a refractive or  
reflective mode different from the mode in which the  
second prisms in at least one of said second areas  
work.
11. The device as claimed in any one of claims 8 to 10,  
10 characterized in that it comprises at least one  
third area comprising third prisms, each third prism  
having a first side and a second side which forms  
with a main axis (AA') an angle greater than that  
15 formed by the first side and the main axis (AA'),  
and being designed to transmit an incident ray from  
said projection means in line with said main axis,  
the third prisms working in a reflective or  
transmissive mode different from the working mode of  
20 the first prisms.
12. The device as claimed in any one of claims 8 to 11,  
characterized in that it comprises at least one  
fourth area comprising fourth prisms, each fourth  
25 prism having a first side and a second side which  
forms with a main axis (AA') an angle greater than  
that formed by the first side and the main axis  
(AA'), and being designed to transmit an incident  
ray from said projection means in a direction that  
30 is different from the main axis, the fourth prisms  
working in a reflective or transmissive mode  
different from the working mode of the second  
prisms.
13. The device as claimed in any one of claims 1 to 12,  
35 characterized in that the Fresnel screen comprises  
diffusion means.

14. A Fresnel lens for a projection display device with light source as claimed in any one of claims 1 to 13,  
characterized in that it includes at least one first area (Z1, Z3) comprising first prisms (28, 40; 41),  
each first prism having a first side (30, 42) and a second side (32, 44) which forms with a main axis (AA') an angle greater than that formed by the first side and the main axis (AA'),  
the second side (32, 44) of the first prism being designed to collimate, in line with the main axis (AA'), an incident ray (R1, R3) from said projection means,  
said lens having symmetry of revolution about said main axis,  
and in that said Fresnel lens includes one second area (Z2, Z4) comprising second prisms (34, 46),  
each second prism having a first side (34, 48) and a second side (38, 50) which forms with a main axis (AA') an angle greater than that formed by the first side (34, 48) and the main axis (AA'),  
the second side of the second prism being designed to transmit, in a first direction (R2', R4') different from the main axis (AA'), an incident ray (R2, R4) from said projection means.